ENTOMOLOGICAL SOCIETY
OF BRITISH COLUMBIA

PROCEEDINGS

OF THE

ENTOMOLOGICAL SOCIETY

—OF—

BRITISH COLUMBIA

FEBRUARY, 1920
NUMBER 16
SYSTEMATIC SERIES

VICTORIA, B.C.:
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BRITISH COLUMBIA ENTOMOLOGICAL SOCIETY

MINUTES OF NINETEENTH ANNUAL MEETING

The Nineteenth Annual Meeting of the B. C. Entomological Society was held in the I. O. D. E. Rooms, No. 401 Jones Building, Fort Street, Victoria, on Saturday, February 21st, 1920. The President, Mr. E. H. Blackmore, was in the chair. Seventeen members were present and several visitors.

The minutes of the last year's meeting having been read by the Secretary, it was moved by Mr. Treherne, seconded by Mr. Winson, "That the minutes be adopted." Carried.

The Secretary-Treasurer then presented his annual report.

It was moved by Mr. Day, seconded by Mr. Winson, "That the Secretary's report be adopted." Carried.

It was moved by Mr. Treherne, seconded by Mr. Davidson, "That Mr. Sherman and Mr. Day be appointed auditors to verify the accounts." Carried.

The programme of the meeting was then proceeded with.

In the afternoon the following resolutions were passed:

Moved by Mr. Treherne, seconded by Mr. Lyne, "That this Society, the Entomological Society of British Columbia, being the far western Branch of the old Canadian Entomological Society, represented, in being at present, by the Entomological Society of Ontario, place themselves on record at this their annual meeting held in Victoria, B. C., on February 21st, 1920, as being in favour of establishing National Journals of Entomology and of abolishing our local publication called the 'Proceedings of the Entomological Society of B. C.,' in its present form, provided the articles which normally would appear in these Proceedings appear in the Canadian National Journals, in being or to be formed, should the question arise within the next few years that the construction of such National Journals be considered by all concerned both practical and desirable.

"That we as a Society approve of the principle of co-ordinating entomological work throughout the Dominion, and that we feel that this may be assisted very materially by our supporting the principle of establishing two journals of entomology, one for systematic entomologists (The Canadian Entomologist) and one for economic entomologists (the name to be chosen later), and signifying our willingness to regard our own Proceedings as secondary to the National Journals.

"That this resolution be forwarded to the Secretaries of the Nova Scotia Entomological Society, the Ontario Entomological Society, the Quebec Society for the Protection of Plants, and all other societies interested in entomology in Canada, with the suggestion that they also place before their members the advisability of abolishing their Reports in

their present form and place their papers before a central editorial Committee for inclusion in Canadian National Journals, and that these secretaries be asked to forward the results of their deliberations to the President of the Ontario Entomological Society.

"That the President of the Ontario Entomological Society be requested to submit the resolutions on this matter received from the Secretaries of the various Branch Societies and other Societies, and that he be empowered to place the matter before the Dominion Entomologist with a request that action be taken to submit the question before the Federal Parliament to acquire a yearly Federal Grant for the purpose of maintaining the National Journal.

"That this Society stands willing to commit ourselves to this course of action for a period of three years from this the annual meeting of 1920." Carried.

Moved by Mr. Sherman, seconded by Mr. Winson, "That the Dominion Government be asked to publish a handbook on the Birds of Canada west of the Rocky Mountains, similar to the one recently published on the Birds east of the Rockies." Carried.

Moved by Mr. Treherne, seconded by Mr. Winson, "That a Committee be formed to interview Mr. Kermode and discuss this resolution with him." Carried.

Messrs. Anderson, Winson and Carter were appointed a Committee.

Following a discussion on the best methods of combating the Tent Caterpillar, it was moved by Mr. Treherne, seconded by Mr. Davidson, "That the Secretary write to the Natural History Societies of Victoria and Vancouver asking them to co-operate with the B. C. Entomological Society in bringing the matter to the notice of the civic authorities." Carried.

Moved by Mr. Sherman, seconded by Mr. Day, "That the giving of prizes to school children at the Fall Fairs for the best collection of insects be left to the discretion of the Advisory Board." Carried.

Moved by Mr. Winson, seconded by Mr. Davidson, "That the subscriptions of new members joining later than August in any year shall be good for the whole of the following year." Carried.

Moved by Mr. Treherne, seconded by Mr. Winson, "That the Victoria representatives of the Advisory Board arrange with a dealer in the city to act as agent for entomological supplies." Carried.

The following officers were elected:

Hon. President—Francis Kermode.

President—E. H. Blackmore.

Vice-Presidents—Coast, R. S. Sherman; Interior, R. C. Treherne.

Advisory Board—Messrs. J. Davidson, J. W. Gibson, L. E. Breun, E. W. White, L. E. Marmont.

Hon. Secretary-Treasurer—W. Downes.

REPORT OF SECRETARY-TREASURER

I beg to submit the report of the work done by the B. C. Entomological Society during the year 1919.

The membership of the Society has increased during the past year and a number of new members have joined. We have now forty-two members in good standing, as compared with twenty-five reported as paid up the previous year, which is a gratifying increase and indicates that renewed interest is being taken in our work, and that the Society is recovering from the setback it received during the years of the war.

In respect to membership, ours is the strongest branch of the Ontario Entomological Society.

In accordance with a resolution passed at last year's meeting, I duly communicated with the Secretary of the Parent Society regarding the possibility of our receiving associate members to our branch. His reply was to the effect that there was apparently nothing in the constitution of the Parent Society to prevent this, though such associate members would not be entitled to the Canadian Entomologist or the Proceedings of the Ontario Society unless the full fee was paid.

The sum of $100.00 was offered last year by the Society to provide prizes at the Fall Fairs for the best collections of insects made by school children. By the advice of Mr. J. W. Gibson, Director of Agricultural Instruction, the following Fairs were selected: New Westminster, Vancouver, Kelowna, Armstrong, Trail, Kamloops, Nelson, Penticton, Chilliwack, North and South Saanich, Cowichan, Nanaimo, Surrey, Langley. Mr. Gibson was also kind enough to communicate with the teachers at these points, asking them to draw the attention of the pupils to this competition. Probably owing to the fact that it was rather late in the season before the matter was brought to the attention of the schools, less interest was taken than would otherwise have been the case, but the prizes were competed for at Nelson, Kelowna, Cowichan and Langley, and the sum of $27.50 was distributed in prize money. In view of the increased attention paid to the teaching of Entomology in the schools, it is hoped that the Society will be able to continue to offer these prizes.

During the year the library has been increased by the purchase of a number of works on Entomology. The sum of $150.00 was voted last year for the purchase of books, but by the President's suggestion, it was decided to expend $100.00 at first. A list of desirable works was drawn up and submitted to the President and members of the Advisory Board for consideration, and was approved by them after some alterations and reductions in the list had been made. The sum expended has been $101.86, on which $11.86 is still owing. In all, 33 works were purchased, and the majority of these are bound volumes, and with the exception of one or two smaller papers, are standard works

and monographical in their scope. With regard to the unexpended balance we recommend that this be kept in hand and no further purchases of books made until the Society has published the last year's Proceedings and Bulletin No. 11, as the cost of publishing has so greatly increased that when these are paid for we shall only have a small balance left.

During the winter the Society published Bulletin No. 12, being the Proceedings of the Society for 1918. The editing was kindly undertaken by Mr. Blackmore, and the Bulletin may be considered to be fully equal to its predecessors. Copies have been sent to all the British Columbia members and to all names on our complimentary mailing list, and in due course will also be sent to each member of the Ontario Society and affiliated branches.

REPORT OF THE TREASURER

The Society has a cash balance in hand of $282.42. Against this there is the balance, $11.86, due on library books purchased and the unexpended balance of library vote—$48.14. The cost of printing the Society's Proceedings this year was greater than previously, and amounted to $208.25. Of the amount voted for prize money, $27.50 has been disbursed, and as the vote was for one season only, the balance accrues to the funds of the Society.

Although the Society has a fair cash balance in hand and our financial position may be regarded as satisfactory, nevertheless it should be remembered that we have greater calls upon our resources than hitherto. Having once launched upon the policy of encouraging the study of Entomology in the schools by offering prizes for collections at the Fall Fairs, and if it is desirable that we should continue to offer these prizes, we will require to set aside a yearly sum for that purpose. Also we are still behind in the publication of our Bulletin, there being a number of economic papers to publish and the Proceedings for 1919. Thus, we shall hardly be able, with the balance we have in hand, to publish more than one Bulletin this year, and pass a reduced vote for prizes at the Fairs.

W. DOWNES, Hon. Secretary-Treasurer.

NOTES ON THE AEOLOTHRIPIDAE (2)

By R. C. Treherne, Entomologist in Charge for British Columbia
Dominion Department of Agriculture

In a previous issue of our Proceedings (No. 12, February, 1918), I gave the Society certain suggestions on this group of Thysanoptera which were intended to assist beginners meeting with members of this group for the first time. In this present paper I wish to extend the information further by dwelling on certain life history and habit notes and by presenting a catalogue on certain of the genera and species.

It would appear that the life histories and habits of the several species of Aeolothripidae are not known with a great degree of exactitude. Adults are recorded to be "*on the foliage of*," "*on*" or "*in the flowers of*" certain plants, with little to indicate their feeding habits. C. B. Williams, in the Annals of Applied Biology 1:240:1915, reports **fasciatus** the type of the genus **Aeolothrips,** common in England on peas and beans, as "partly carnivorous but also feeds on pollen and plant juices." It is my belief that Thysanopterists regard the **Aeolothrips** as predacious in their primary functions, but concede that they are also phytophagus. J. R. Watson in Florida, referring to the "black and white" cereal thrips **(Aeolothrips bicolor),** states that this species is "often abundant on oats in spring and damages them materially." With my own species, **Ae. auricestus,** I have failed to determine its exact feeding habits but from its numbers in clumps of **Elymus condensatus** and from certain peculiar decolored areas in the leaves, I am inclined to think it is phytophagus.

The mouth parts of thrips have been discussed on many occasions by many writers, and several authors have used **Aeolothrips** upon which to base their discussions. Garman, Uzel and Comstock have contributed in this connection, and from what I can gather, while there has been a slight difference of opinions in the placing and naming of certain organs of the mouth, the view is generally held that "the mouth parts are chiefly used for sucking but intermediate in form between those of the sucking and those of the biting insects."

The predacious habits of several members of this family are undoubted, in view of more recent observations. In British Columbia **Ae. fasciatus** may be frequently found in association with swarms of **Frankliniella tritici** in the flower heads of plants; **Ae. annectans** has also occurred in sufficient numbers with **Thrips tabaci** on onion foliage to leave little doubt, although, unfortunately, it has not as yet been proven, that they are carnivorous. Watson, in Florida, has observed that **Ae. floridensis** is invariably found in association with other species, although he draws no conclusions from this occurrence. C. B. Williams, in "The Entomologist" 49:277:1916, has the following to say on the

situation relating to the association between the pea thrips and **Ae. fasciatus:**

> "I was able to feed larvae of the predaceous thrips, **Ae. fasciatus,** on the larvae of the pea thrips in captivity. One larva of **Ae. fasciatus** sucked and killed three larvae of **K. pisivora** in about three hours." . . . . . He "found adults (commonly) and larvae (occasionally) in pea flowers but has not actually seen them feeding on the pea thrips in the wild state. There is little doubt, however, that they do so, as the species is invariably predaceous and is indeed the chief enemy of **Limothrips cerealium."**

Kurdjumov in a Report from the Poltava Agricultural Experimental Station, Russia, 18:1913, records the fact that the larvae of **Ae. fasciatus** are enemies of **Haplothrips aculeatus** and **H. tritici.** According to the same authority,

> "this predacious thrips, according to Uzel, winters in the larval and egg stage; both adults and larvae being found on various plants and the larvae have been found feeding on **Aphis crataegi** and **A. rumicis"**

and on the eggs and larvae of several other insects.

With these few words I would leave with you a catalogue on this family as a supplementary index to my first paper in our Proceedings on this subject in 1918. I would draw your attention to the fact that a great deal is yet to be learnt on the habits and life histories of the members of this family, and would urge that an endeavour be made to make a closer study of this group. It would appear to me quite clearly from my brief acquaintance with this group of insects that nearly all the energy thus far expended, has been spent on devising new genera and establishing new species. I do not know how this applies to other groups of insects, but it is my belief that in many ways what is true in the Thysanoptera is also true in many other Orders. Not enough time has been spent on the bionomics of the species; species which are often easily determined and readily available for study. The dread of the junior entomologist may easily be removed if he realizes this situation within the science, which at once enables him to take almost any insect in hand and record by actual and accurate personal observation its habits and life history under strictly natural conditions. The charm of such a field of study should draw and attract a large number of students, and we as a Society should lend our influence towards developing the love for natural objects that usually abides in the mind of most boys and girls, by training their powers of observation.

MELANOTHRIPS Haliday

1836. Haliday. Entom. Mag. 450.

> "Antennae distincte 9-articulatae: os breve: palporum maxillarium articuli subaequales: alae anticae costa pubescentes, nervis transversis tribus: tibiae anticae apicae productae: ,terebra a basi parum recurva."

1880. Taschenberg. Prak. Insek-Kunde. 4:212.
1895. Beach. Proc. Iowa. Acad. Sci. 3:215.
1907. Buffa. Processi verb. della Soc. Tosc. d. Sci. Nat. 4.
1907. Buffa. Atti d. Soc. Tosc. d. Sci. Nat. 23.

extincta Scudder

1875. *Melanothrips.* Scudder. Bull. Geol. Survey 2.

ficalbii Buffa

1907. *Melanothrips.* Buffa. Atti. Soc. Tosc. Pro. verb. 16:58.
1907. *Melanothrips.* Buffa. Atti. d. Soc. Tosc. d. Sci. Nat. 23.
1913. *Melanothrips.* Bagnall. Ent. Mon. Mag. 24.
1913. *Melanothrips.* Bagnall. Jr. Econ. Biol. 8:231.
1913. *Melanothrips.* Bagnall. Jr. Econ. Biol. 8:155.
HABITAT—Italy; England.

fuscus Sulzer

1776. *Thrips fuscus.* Sulzer. Abg. Gesch. d. Ins. 112.
1788. *Thrips fusca.* Gmelin. C. Linne. Syst. Nat. 2223.
1836. *Melanothrips obesa.* Haliday. Ent. Mag. 450. TYPE.
1836. *Melanothrips obesa.* Burmeister. Hand. d. Ent. 2:417.
1843. *Melanothrips obesa.* Amyot et Serville. Ins. Hemip. 645.
1852. *Melanothrips obesa.* Haliday. Walk. Homop. Ins. Brit. Mus. 1116.
1852. *Melanothrips obesa.* Heeger Sitzb. Ahad. Wiss. Wien. 8:133.
1895. *Melanothrips fusca.* Uzel. Mon. d. Ord. Thys.
1907. *Melanothrips fusca.* Buffa. Atti. d. Soc. Tosc. d. Sci. Nat. 23.
1907. *Melanothrips fusca.* Proces. verb. d. Soc. Tosc. d. Sci. Nat.
1911. *Melanothrips fuscus.* Bagnall. Jr. Econ. Biol. 6:10.
1912. *Melanothrips fuscus.* Bagnall. Jr. Econ. Biol. 7.
1913. *Melanothrips fuscus.* Bagnall. Ent. Mon. Mag. 24.
1913. *Melanothrips fuscus.* Bagnall. Jr. Econ. Biol. 8:155.
1913. *Melanothrips fuscus.* Williams. Jr. Econ. Biol. 8:218.
1915. *Melanothrips fuscus.* Williams. Ann. App. Biol. 1:240.
1915. *Melanothrips fuscus.* Bagnall. Ann. Mag. Nat. Hist. 15.
HABITAT—On **Sinapis arvensis** and in various flowers in England; Austria; Bohemia; on **Brassica rapae** in Italy; Tunis.

nigricornis Bagnall

1913. *Melanothrips.* Bagnall. Ent. Mon. Mag. 24.
HABITAT—In flowers of Convolvulus. Tunis.

DESMOTHRIPS Hood

1915. Hood. Proc. Biol. Soc. Wash. 28:57.

australis Bagnall

1914. *Orothrips.* Bagnall. Ann. Mag. Nat. Hist. 13:287. TYPE.
1915. =*Desmothrips.* Hood. Proc. Biol. Soc. Wash. 28:57.
1916. *Orothrips.* Bagnall. Ann. Mag. Nat. Hist. 17.
HABITAT—In flowers of **Xanthorrhoea australis** in Victoria, Australia.

OROTHRIPS Moulton

1907. Moulton. U. S. Dept. Agr. Bur. Ent. Tech. Ser. 12:45.

kelloggii Moulton

1907. *Orothrips.* Moulton U. S. Dept. Agr. Bur. Ent. Tech. Ser. 12:46. TYPE.
1911. *Orothrips.* Moulton. U. S. Dept. Agr. Bur. Ent. Tech. Ser. 21:21.
1918. *Orothrips.* Treherne. Proc. B. C. Ent. Soc. 12:29.
HABITAT—In blossoms of **Manzanita manzanita** and **Arbutus menziesii** in California, U. S. A.

kelloggii yosemitii Moulton

1911. *Orothrips.* Moulton. U. S. Dept. Agr. Bur. Ent. Tech. Ser. 21:2.
1918. *Orothrips.* Treherne. Proc. B. C. Ent. Soc. 12:29.
1919. *Orothrips.* Treherne. Can. Ent. 51:181.
HABITAT—U. S. A.: in blossoms of **Ceanothus** in California;
Canada: off **Amelanchier** in British Columbia.

propinuus Bagnall

1916. *Orothrips.* Bagnall. Ann. Mag. Nat. Hist. 17.
HABITAT—On sweet pea, Victoria, Australia.

tenuicornis Bagnall

1916. *Orothrips.* Bagnall. Ann. Mag. Nat. Hist. 17.
HABITAT—From flowers of **Erythroea australis,** Australia.

STOMATOTHRIPS Hood

1912. Hood. Proc. Biol. Soc. Wash. 25:63.

flavus Hood

1912. *Stomatothrips.* Hood. Proc. Biol. Soc. Wash. 25:64. TYPE.
HABITAT—Mexico; Texas; Illinois, U. S. A.; on cotton, grasses and weeds.

MITOTHRIPS Trybom.

1912. Trybom. Ent. Tidskr. 33:146.
1913. Bagnall. Jr. Econ. Biol. 8:157.

megalops Trybom.

1912. *Mitothrips.* Trybom. Ent. Tidskr. 33:147. TYPE.
1912. =*Franklinothrips.* Bagnall. 2nd Ent. Congress. 397.
1915. =*Mitothrips.* Hood. Ent. News. 26:162.
1915. *Mitothrips.* Bagnall. Jr. Linn. Soc. Zool. 32:496.
HABITAT—British East Africa.

petulans Bagnall

1915. *Mitothrips.* Bagnall. Journ. Linn. Soc. Zool. 32:496.
HABITAT—On cacao leaves in Trinidad, B. W. I.

ANKOTHRIPS Crawford

1909. Crawford. Pom. Col. Jr. Ent. 1:109.
1915. Bagnall. Ann. Mag. Nat. Hist. 15.
1918. Treherne. Proc. B. C. Ent. Soc. 12:30.

robustus Crawford

1909. *Ankothrips.* Crawford. Pom. Col. Jr. Ent. 1:109. TYPE.
HABITAT—On **Umbellularia** and **Ceanothus** in California, U. S. A.

ERYTHROTHRIPS Moulton

1911. Moulton. U. S. Dept. Agr. Bur. Ent. Tech. Ser. 21.34.

arizonae Moulton

1911. *Erythrothrips.* Moulton. U. S. Dept. Agr. Bur. Ent. Tech. Ser. 21:34. TYPE.
1918. *Erythrothrips.* Treherne. Proc. B. C. Ent. Soc. 12:29.
HABITAT—On Orange and Olive blossoms in Arizona; on **Rhamnus purshiana** in California, U. S. A.

DESMOTHRIPS Hood

1914. *Orothrips.* Bagnall. Ann. Mag. Nat. Hist. 13:287.
1915. =*Desmothrips.* Hood. Proc. Biol. Soc. Wash. 28:57.

australis Bagnall

1914. *Orothrips.* Bagnall. Ann. Mag. Nat. Hist. 13:287. TYPE.
HABITAT—In flowers of **Xanthorrhoea australis,** Victoria, Australia.

RHIPIDOTHRIPS Uzel

1895. Uzel. Mon. d. Ord. Thys. 67.

brunneus Williams

1913. *Rhipidothrips.* Williams. Jr. Econ. Biol. 8:216.
1916. *Rhipidothrips.* Williams. Entomologist. 49:221.
HABITAT—From grass, Sussex, England.

gratiosus Uzel

1895. *Rhipidothrips gratiosa.* Uzel. Mon. d. Ord. Thys. 66.
1912. *Rhipidothrips gratiosa.* Bagnall. Jr. Econ. Biol. 7:191.
1913. *Rhipidothrips gratiosa.* Williams. Jr. Econ. Biol. 8:217.
1913. *Rhipidothrips gratiosus.* Bagnall. Jr. Econ. Biol. 8:232.
HABITAT—Cereal fields in England; Bohemia.

niveipennis Reuter

1901. *Rhipidothrips.* Reuter. Acta. Soc. Faun. Fenn. 17:30.
1909. *Rhipidothrips.* Bagnall. Jr. Econ. Biol. 4.
1912. *Rhipidothrips.* Bagnall. Jr. Econ. Biol. 7:190.
1913. *Rhipidothrips.* Williams. Jr. Econ. Biol. 8:218.
1916. *Rhipidothrips.* Williams. Entomologist. 49:221.
HABITAT—On **Abies** and **Convallaria** in Finland.

juniperina Linnaeus

1761. *Thrips.* Linnaeus. Fauna Svecica. 265.
1901. =*Rhipidothrips niveipennis?* Reuter. Acta. Soc. pro. Faun. Flora Fenn. 17.

FRANKLINOTHRIPS Back

1912. Back. Ent. News. 23:75.
1912. Bagnall. Trans. 2nd Ent. Congress. 397.
1913. Bagnall. Jr. Econ. Biol. 8:157.

insularis

(In the Review of Applied Entomology, London, Vol. 3, page 468, 1915, reference is made to **Franklinothrips insularis.** It is possible that this refers to **Frankliniella insularis.** Franklin.)

tenuicornis Hood

1915. *Franklinothrips.* Hood. Can. Ent. 26:164.
1918. *Franklinothrips.* Williams. Trin. & Tob. Bull. 17:144.
1918. *Franklinothrips.* Treherne. Proc. B. C. Ent. Soc. 12:30.
HABITAT—On leaves on **Inga,** cacao, **Hibiscus rosa sinensis, Ipomoea** in Trinidad; Panama.

vespiformis Crawford

1909. *Aeolothrips.* Crawford. Pom. Col. Jr. Ent. 1:109. TYPE.
1911. *Aeolothrips.* Moulton. U. S. Dept. Agr. Bur. Ent. Tech. Ser. 21:21.
1912. =*Franklinothrips (Aeolothrips).* Back. Ent. News. 23:74, 75.
1912. *Franklinothrips (Aeolothrips).* Hood. Proc. Biol. Soc. Wash. 25:62.

1913. *Franklinothrips.* Hood. Psyche. 20:119.
1915. *Franklinothrips.* Bagnall. Linn. Soc. Jr. Zool. 32:498.
1915. *Franklinothrips.* Hood. Ent. News. 26:163.
1917. *Franklinothrips.* Bagnall. Jr. Zool. Res. 2:21.
1918. *Franklinothrips.* Watson. Florida Buggist. 2:66.
1918. *Franklinothrips.* Williams. Trin. & Tob. Bull. 17:143.
1918. *Franklinothrips.* Treherne. Proc. B. C. Ent. Soc. 12:30.

HABITAT—U. S. A.: Florida on **Citrus** foliage; Nicaragua; Texas, Panama Canal; West Indies: Trinidad; St. Vincent; Central America.

AEOLOTHRIPS Haliday

albicinctus Haliday

1836. *Ae. albicincta.* Haliday. Ent. Mag. 3:451.

"Atra, abdominis apice ferrugineo; antennis basi et abdominis antici annulo albis."

1838. *Ae. albicincta.* Burmeister. Handb. d. Ent. Bd. 2:418.
1843. *Ae. albocincta.* Amyot et Serville. Ins. Hemip. 646.
1852. *Ae. albicincta.* Haliday, Walker. Homop. Ins. Brit. Museum. 1118.
1879. *Ae. albicincta.* Reuter. Diagn. ofv. nya. Thys. f. Finland. 7.
1895. *Ae. albocincta.* Uzel. Mon. Ord. Thys. 75.
1899. *Ae. albicincta.* Reuter. Acta. Soc. Fauna. Flora. Fennica. 17:33.
1907. *Ae. albocincta.* Buffa. Atti. Soc. Tosc. Sci. Nat. Mem. 23:57.
1907. *Ae. albocincta.* Buffa. Processi verbali d. Soc. Tosc. Sci. Nat.
1908. *Ae. albocinctus.* Buffa. Redia. 5:134.
1911. *Ae. albocinctus.* Bagnall. Jr. Econ. Biol. 6:10.
1912. *Ae. albocinctus.* Bagnall. Trans. 2nd Ent. Congress. 397.
1913. *Ae. albicinctus.* Karny. Verh. k. k. zool-bot. Gesellsch. Wien. 64:51.
1915. *Ae. albicinctus.* Hood. Ent. News. 26:165.

HABITAT—England; Finland; Sweden; Austria; on **Aster sinensis** in Italy; Portugal; Sardinia; on corn leaves and on onion in New York State, U. S. A.

annectans Hood

1916. *Aeólothrips.* Hood. Proc. Biol. Soc. Wash. 29:109.
1917. *Aeolothrips.* Hood. Ins. Ins. Men. 5:55.
1919. *Aeolothrips.* Treherne. Can. Ent. 51:182.

HABITAT—On foliage of **Robinia pseudo-acacia,** pear, in flower of **Erigeron annuus** in Maryland; Virginia; New York State, U. S. A.: on foliage of a variety of plants at Victoria, B. C., and in the Okanagan Valley in British Columbia (Canada).

auricestus Treherne

1919. *Aeolothrips.* Treherne. Can. Ent. 51:184.

HABITAT—On foliage of **Elymus condensatus** in the Okanagan Valley, British Columbia (Canada).

bicolor Hinds

1902. *Aeolothrips.* Hinds. Proc. U. S. Nat. Mus. 26:130.
1907. *Aeolothrips.* Hooker. U. S. Dept. Agr. Bur. Ent. Tech. Ser. 65:13.
1911. *Aeolothrips.* Moulton. U. S. Dept. Agr. Bur. Ent. Tech. Ser. 23:21.
1912. *Aeolothrips.* Jones. U. S. Dept. Agr. Bur. Ent. Tech. Ser. 23:1.
1912. *Aeolothrips.* Bagnall. Trans. 2nd Ent. Congress. 397.
1912. *Aeolothrips.* Back. Ent. News. 23:74.
1913. *Aeolothrips.* Morgan. U. S. Nat. Mus. 46:42.
1915. *Aeolothrips.* Ent. Rept. Univ. Florida. 64.

1916. *Aeolothrips.* Watson. Ent. News. 27:127.
1917. *Aeolothrips.* Hood. Ins. Ins. Men. 5:55.
1918. *Aeolothrips.* Watson. Florida Buggist. 2:65.
1918. *Aeolothrips.* Treherne. Proc. B. C. Ent. Soc. 12:30.
HABITAT—On oats and wheat in Southern United States; on various plants and grasses at Amherst, Massachusetts; on **Plantago virginica,** citrus, corn, strawberry, grain, onion, oats, rutabaga in Florida; in sod in Tennessee; in Indiana; Virginia; Maryland; Illinois; Minnesota; Kansas; Texas (U. S. A.).

brevicornis Bagnall

1915. *Aeolothrips.* Bagnall. Ann. Mag. Nat. Hist. 15.
HABITAT—In flowers, Cape Town, South Africa.

crassus Hood

1912. *Aeolothrips.* Hood. Proc. Ent. Soc. Wash. 14:130.
HABITAT—In flower of **Hydrophyllum virginicum** and on wild grape in Maryland, U. S. A.

fasciatus Linnaeus

1758. *Thrips fasciata.* Linnaeus. Syst. Naturae. 10:457. TYPE.
1761. *Thrips fasciata.* Linnaeus. Fauna Svecica. 266.
"Thrips elytris albis nigrisque fasciatus, corpore atro. Habitat in floribus, uti praecedentes, sed rarior aliis. Desc: Omnia, ut in praecedenti, (T. juniperina) sed fasciae transversae albae et nigrae alas distinguunt; animal totum atrum, praesedenti majus, elytra nigra fasciae tres niveae secant, quarum una in apicae, altera in medio, tertia versus basi elytrorum."
1767. *Thrips fasciata.* Linnaeus. Syst. Naturae. 12 & 13:743.
1775. *Thrips fasciata.* Fabricius. Systema Ent. 745.
1781. *Thrips fasciata.* Schrank. Enum. Insect. Aust. 297.
1781. *Thrips fasciata.* Fabricius. Species Insectorum. 2:397.
1781. *Thrips fasciata.* Fabricius. Mantissa Insectorum. 2:320.
1788. *Thrips fasciata.* Gmelin. Linn. Syst. Nat. 13:2223.
1789. *Thrips fasciata.* Berkenhout. Syn. Nat. Hist. Gt. Br. & Ire. 123.
1802. *Thrips fasciata.* Stew. Elem. of Nat. Hist. 2:114.
1803. *Thrips fasciata.* Fabricius. Systema Rhyngotorum. 314.
1806. *Thrips fasciata.* Turton. Gen. Syst. of Nat. 2:717.
1836. *Aeolothrips (Coleothrips) fasciata.* Haliday. Ent. Mag. 3:451.
1838. *Aeolothrips fasciata.* Burmeister. Hundb. d. Entom. 2:417.
1843. *Aeolothrips fasciata.* Amyot et Serville. Hist, nat. d. Ins. Hemip. 646.
1852. *Aeolothrips (Coleothrips) fasciata.* Haliday, Walk. Homop. Br. Mus. 4:1117.
1852. *Aeolothrips fasciata.* Heeger. Sitz. d. Acad. d. Wiss. Wien. 8:135.
1855. *Coleothrips trifasciata.* Fitch. Count. Gent. 6:385.
1857. *Coleothrips trifasciata.* Fitch. 2nd Rept. Nox. Ins. N. Y. 308.
1871. *Thrips fasciata.* de Man. Tijdschr. v. Entom. 147.
1879. *Aeolothrips (Coleothrips) fasciata.* Reuter. Ofv. Fin. Soc. 21:214.
1882. *Coleothrips fasciata.* Pergande. Entomologist. 95.
1886. *Coleothrips trifasciata.* Webster. Rept. Dept. Agr. 577.
1889. *Coleothrips trifasciata.* Thaxter. Rept. Conn. Agr. Exp. Sta. 180.
1891. *Coleothrips 3-fasciata.* Riley-Howard. Ins. Life. 3:301.
1892. *Coleothrips trifasciata.* Townsend. Can. Ent. 24:197.
1893. *Coleothrips trifasciata.* Gillette. Bull. 24. Col. Agr. Exp. Sta. 15.
1893. *Cloeothrips trifasciata.* Davis. Mich. Agr. Exp. Sta. 102:39.

1895. *Coleothrips trifasciatus.* Cockerell. N. Mex. Agr. Exp. Sta. 15:71.
1895. *Aeolothrips fasciata.* Uzel. Mon. d. Ord. Thys. 72.
1896. *Coleothrips trifasciata.* Davis. Spec. Mich. Agr. Exp. Sta. 2:13.
1901. *Aeolothrips fasciata.* Tumpel. Die Geradflugler Mitteleuropas. 286.
1902. *Aeolothrips fasciatus.* Hinds. U. S. Nat. Mus. 26:127.
1907. *Aeolothrips fasciata.* Buffa. Atti. d. Soc. Tosc. d. Sci. Nat. 23:57.
1911. *Aeolothrips fasciatus.* Moulton. U. S. Dept. Agr. Tech. Ser. 21:23.
1913. *Aeolothrips fasciatus.* Stcherbakov. Rev. Russe d. Ent. 13:461.
1913. *Aeolothrips fasciatus.* Kurdjumov. Trans. Poltava Agr. Exp. Sta. 18:19.
1913. *Aeolothrips fasciatus.* Bagnall. Jr. Econ. Biol. 8:156.
1915. *Aeolothrips fasciatus.* Williams. Ann. App. Biol. 1:240.
1915. *Aeolothrips fasciatus.* Bagnall. Ann. Mag. Nat. Hist. 15.
1916. *Aeolothrips fasciatus.* Williams. Entomologist. 49:277.
1916. *Aeolothrips fasciatus.* Watson. Ent. News. 27:127.
1916. *Aeolothrips fasciatus.* Ross. Ent. Soc. Ont. 47:27.
1918. *Aeolothrips fasciatus.* Treherne. Proc. B. C. Ent. Soc. 12:30.
1919. *Aeolothrips fasciatus.* Treherne. Can. Ent. 51:181.

HABITAT—On various grains, grasses, flowers and weeds; England; Russia; Austria; Finland; Germany; Africa: Tunis; Canary Islands; United States: Connecticut, Indiana, Iowa, Michigan, Massachusetts, New Mexico, New York, Ohio, Arizona, Oregon, California; Canada: British Columbia, Ontario, Manitoba.

floridensis Watson

1916. *Aeolothrips.* Watson. Ent. News. 27:126.
1918. *Aeolothrips.* Watson. Florida Buggist. 2:65.
1918. *Aeolothrips.* Treherne. Proc. B. C. Ent. Soc. 12:30.

HABITAT—On oats and corn in Florida, U. S. A.

gloriosus Bagnall

1914. *Aeolothrips.* Bagnall. Ann. Mag. Nat. Hist. 14.

HABITAT—Sardinia.

kuwanaii Moulton

1907. *Aeolothrips.* Moulton. U. S. Dept. Agr. Bur. Ent. 12:47.
1907. *Aeolothrips* (variety robustus). Moulton. U. S. Dept. Agr. Bur. Ent. 12:48.
1912. *Aeolothrips.* Hood. Proc. Ent. Soc. Wash. 14:130.
1918. *Aeolothrips.* Treherne. Proc. B. C. Ent. Soc. 12:30.

HABITAT—On **Ceanothus thyrsiflorus** in California, U. S. A., and **robustus** on apricot tree in California, U. S. A.

longiceps Crawford

1909. *Aeolothrips.* Crawford. Pom. Col. Jr. Ent. 1:101.
1912. =*Franklinothrips.* Bagnall. Trans. 2nd Ent. Congress. 397.
1913. *Aeolothrips.* Bagnall. Jr. Econ. Biol. 8:157.
1915. =*Aeolothrips kuwanaii.* Hood. Ent. News. 26:162.
1916. *Aeolothrips.* Watson. Ent. News. 27:127.
1918. *Aeolothrips.* Treherne. Proc. B. C. Ent. Soc. 12:30.

HABITAT—On **Umbellularia** and **Ceanothus** in California, U. S. A.

Melaleuca Haliday

1836. *Aeolothrips.* Haliday. Entom. Mag. 3.
1911. *Ae. melaleucus.* Bagnall. Jr. Econ. Biol. 6:10.
1916. *Ae. melaleuca.* Hood. Proc. Biol. Soc. Wash. 29:110.

"Apparently very close" to **Ae. annectans** Hood, but type "cannot now be secured for comparison."

HABITAT—British Isles.

nasturtii Jones

1912. *Aeolothrips.* Jones. U. S. Dept. Agr. Bur. Ent. Tech. Ser. 23:2.
1912. =*Franklinothrips.* Bagnall. Trans. 2nd Ent. Congress. 397.
1913. *Aeolothrips.* Bagnall. Jr. Econ. Biol. 8:157.
1915. =*Aeolothrips.* Hood. Ent. News. 26:162.
1916. *Aeolothrips.* Watson. Ent. News. 27:127.
1918. *Aeolothrips.* Treherne. Proc. B. C. Ent. Soc. 12:30.
HABITAT—On flowers of **Nasturtium officinale** in California, U. S. A.

vittatus Haliday

1836. *Aeolothrips.* Haliday. Ent. Mag. 3.
1911. *Aeolothrips.* Bagnall. Jr. Econ. Biol. 6:10.
1912. *Aeolothrips.* Bagnall. Jr. Econ. Biol. 7:189.
HABITAT—England; Finland; Sweden; Austria-Hungary.

vittipennis Hood

1912. *Aeolothrips.* Hood. Proc. Ent. Soc. Wash. 14:129.
1917. *Aeolothrips.* Hood. Ins. Ins. Men. 5:64.
1918. *Aeolothrips.* Treherne. Proc. B. C. Ent. Soc. 12:30.
HABITAT—U. S. A.: on leaf of hickory in Maryland; on honey locust **(Gleditsia triacanthos L),** Illinois; and yellow locust **(Robinia pseudacacia),** in Washington D. C.

tibialis Reuter

1901. *Aeolothrips.* Reuter. Acta. Soc. Faun. Fenn. Finland. 17:33.
1913. *Aeolothrips.* Bagnall. Jr. Econ. Biol. 8:157.
1918. *Aeolothrips.* Treherne. Proc. B. C. Ent. Soc. 12:30.
HABITAT—Finland.

tiliae Bagnall

1913. *Aeolothrips.* Bagnall. Jr. Econ. Biol. 8:156.
HABITAT—On **Tilia** in Norway.

versicolor Uzel

1895. *Aeolothrips.* Uzel. Mon. d. Ord. Thys. 69.
HABITAT—Austria.

ERRATA

In the Proceedings of the Entomological Society, February, 1918, Number 12, Systematic Series, on pages 27-33; in my article on "Notes on the Aeolothripidae," the following errors have appeared in the text:

On page 27—Line 15, **Physoda** should read **Physopoda.**
Line 22, **Aeolothripidea** should read **Aeolothripoidea.**
On page 28—The word **Melanothrips** requires the author's name after it, thus reading "**Melanothrips** Haliday."
Mitrothrips should read **Mitothrips.**
On page 29—**Rhipidothrips** requires the author's name after it, thus reading "**Rhipidothrips** Uzel."
E. arizona should read **E. arizonae.**

NEW SPECIES OF MYCETOPHILIDAE

By R. S. Sherman

Mycomya mutabilis sp. nov.

Male. Length 4.25 m.m. Head, face, and antennae brownish, the basal joints of the last and the palpi yellow; intermediate antennal joints about twice as long as wide. Thorax brown with obscure darker brown or black vittae separated by grayish pollen. Humerus yellow. Scutellum and metanotum brown. Two strong scutellars in addition to smaller setae. Thoracic, scutellar, and abdominal setae brown. Abdomen brown, posterior and lateral margin slightly yellowish. Hypopygium yellow. Legs long and slender, yellow; fore metatarsus $1^1/_{10}$ times the tibia in length, setae of hind tibia slightly less than diameter of this member. Wings hyaline with grayish tinge; veins brown, subcosta ends in the costa opposite middle of cell R_1, which is 2.5 times as long as wide; the subcostal cross-vein is proximad of the middle of this cell; the basal section of the radial sector and the R-M cross-vein are subequal; R4-5 ends at tip of wing; petiole of the media is equal to M_2; cubitus forks slightly distad of the middle of cell R_1: the wing is 4.75 m.m. in length, which is 2.8 times as long as the fore metatarsus. Halteres yellow. Taken on Savary Island, B. C., April, 1917.

Differs from **M. maxima** in being smaller, darker color, two scutellars, lacking coxal spur, etc. It is nearer to **M. sigma** but differs in length of intermediate flagellar joints, color of thorax, color of wings, length of petiole of media as compared with M_2; forking of cubitus more distad of cross-vein and in greater length of wing as compared with length of fore metatarsus.

Platyura intermedia sp. nov.

Female. Length 3.5 m.m. Yellow. Antennae except the scape fuscous. Thorax yellow with traces of three pale confluent stripes. The base of each abdominal segment dark brown. Wings uniformly yellowish slightly tinged with cinereous in region of R_{2-3}, veins fuscous; subcostal vein ends in costa a little proximad of base of radial sector; R_{2-3} rather long and oblique in position; halteres yellow. Subcostal cross-vein slightly proximad of centre of subcosta; coalesced part of media about equal to the petiole. Anal vein produced to the margin. Fore metatarsus slightly shorter than tibia. Two tibial spurs on middle and hind tibiae. Savary Island, July 21, 1917.

Dziedzickia vernalis sp. nov.

Female. Length 5 m.m. Brown, the first two joints of the antennae, humeri, posterior margins of abdominal segments and the legs, yellow, the latter with brownish tarsi; antennae with third joint about twice its width in length; body opaque, the hairs and bristles reddish yellow, bristles of tibiae shorter than greatest diameter of latter; wings hyaline; subcostal vein terminates in R_1 near distal end of cell R_1, this cell about

1½ times as long as wide, R4-5 strongly bowed forward, peduncle of cell M_1 about twice as long as R-M cross-vein, cubitus, apparently detached, forks near middle of cell R. Fore metatarsus is about .8 as long as the tibia. Halteres yellow. Vancouver, B. C., 8:V:16.

Dziedzickia rutila sp. nov.

Male. Length 5.5 m.m. Yellow, head black, antennae, except the basal joints, fuscous, abdominal segments brown caudad, tarsi browish, tibial spurs lighter yellow than the tibiae, which are dusky yellow; thorax yellow with reddish brown vittae and black hairs; abdominal setae black; scutellum yellow with black hairs; pleura tinged with brown; wings hyaline, subcostal vein terminates in R_1 slightly proximad of centre of cell R_1, this cell about 2½ times as long as wide, R4-5 moderately bowed, peduncle of cell M_1 about twice the length of the R-M cross-vein, cu_1 not detached, forks at the middle of basal cell R, fore metatarsus about ¾ as long as the tibia, anal vein does not reach the margin, halteres pale yellow. Vancouver, B. C., 3:XI:17.

Dziedzickia johannseni sp. nov.

Female. Length 4 m.m. Black, the first two joints of antennae, femora, tibial spurs and halteres, yellow; tibiae and tarsi yellowish brown shading to dark brown in tarsi; abdomen with faint indications of lighter colored marginal bands; thorax black, scutellum, pleurae and coxae brown; hairs reddish yellow; wings hyaline, subcostal vein terminates in R_1, exactly at distal extremity of small cell R_1, this cell about 1½ times as long as wide, R4-5 moderately bowed, peduncle of cell M_1 a little longer than twice the length of R-M cross-vein, cubitus forks at about two-thirds the length of basal cell R_1; fore metatarsus about two-thirds as long as the tibia; half of fore metatarsus swollen on under side, giving this joint a bowed appearance; under side of 2nd, 3rd and 4th tarsal joints evenly swollen, 5th joint slender. Savary Island, 10:IV:17.

Dziedzicka columbiana sp. nov.

Male. Length 4 m.m. Dark brown, the basal joints of antennae, humeri, coxae and femora, yellow; large yellow triangles on sides of 2nd and 3rd abdominal segments; hairs on thorax, scutellum and abdomen yellowish; joints of flagellum somewhat compressed, the third joint of antennae being only slightly longer than wide; wings hyaline, subcostal vein terminates in R_1, near the centre of cell R_1, this cell about 1¼ times as long as wide, R4-5 moderately arched, peduncle of cell M_1 about 1½ times the length of R-M cross-vein, cubitus forks distad of centre of basal cell R_1, anal vein weak and does not reach the border; fore metatarsus about four-fifths the tibia in length; halteres yellow. Vancouver, B. C., 22:V:17.

Dziedzickia occidentalis sp. nov.

Male. Length 5 m.m. Dark brown to black, basal joints of antennae front coxae, femora and stalk of halteres, yellow; hairs of

thorax and abdomen pale; antennal joints of flagellum elongate; wings hyaline, subcostal vein terminates in R_1 proximad of the centre of cell R_1; this cell is three times as long as wide, R_{4-5} strongly arched, peduncle of cell M_1 2¼ times as long as R-M cross-vein, cubitus forks proximad of centre of basal cell R_1 anal vein strong but does not reach the margin. Knob of halteres brown, fore metatarsus about two-thirds as long as the tibia. Savary Island, 8:IV:17.

Rhymosia prolixa sp. nov.

Male. Length 5½ m.m. Yellow, including the two basal joints of the flagellum, palpi and hypopygium; thorax with reddish brown vittae; tergites with triangular brown saddles. Setae of thorax and scutellum black. Hypopygium longer than last abdominal segment, black pilose. A black spot on hind femora at basal fourth. Legs slender, long; coxae and femora yellow, tibiae dusky yellow and tarsi fuscous. Tibial spurs black. Wings yellowish hyaline. Subcosta ends free; petiole of media slightly more than half as long as the R-M cross-vein; fork of cubitus far proximad of the proximal end of the cross-vein. Savary Island, 8:VII:17.

Rhymosia faceta sp. nov.

Male. Length 4 m.m. Yellow, including basal joints of flagellum, palpi and hypopygium. Head fuscous; thorax subfuscous on dorsum and pleurae; coxae, femora and tibiae yellow; tarsi fuscous. Abdomen with wide yellow fasciae on 2nd to 5th segments inclusive, cephalad. Wings hyaline with slight cinereous tinge along costal margin. Setae of thorax and scutellum black. Fore metatarsus subequal to tibia. Two scutellar setae. Subcosta ends in R_1. Petiole of media about two-thirds as long as R-M cross-vein. Cubitus forks under proximal end of this cross-vein. Anal vein extends beyond branch of cubitus. Halteres yellow. Vancouver, B. C., 11:II:17.

Rhymosia seminigra sp. nov.

Male and Female. Length 6 m.m. Dark brown; head black; basal joints of antennae and palpi yellow; humeri yellow; dorsum of thorax dark velvety brown, with pale appressed hairs and black setae; scutellum and metanotum brown; two scutellar setae, black; abdomen dark brown, sixth segment wholly black, segments 2 to 5 with yellow longitudinal bands on the sclerites dorsad, rounded caudad, leaving the posterior margin of these segments fuscous; hypopygium large, yellow with black hairs; legs yellow, hind coxae with fuscous stripe, one basal coxal seta, hind femora darker apically, tibia and tarsi subfuscous to fuscous, fore metatarsus 1¼ length of tibia; apical half of wing cinereous, proximal half hyaline, subcosta ends in R_1; petiole of media and R-M cross-vein subequal; fork of cubitus under fork of media, anal vein ends under fork of cubitus. Three males and three females taken at Vancouver and Savary Island, March, April and October.

Rhymosia pectinata sp. nov.

Male. Length 4.5 m.m. Head fuscous, the scape and palpi yellow; antennae 1½ times the length of thorax. Thorax dull yellow, dorsum and pleurae brownish, with indistinct darker brown vittae; scutellum and metanotum fuscous; hairs yellow, depressed, setae black; two scutellar setae. Segments 2 to 5 of abdomen with yellow fasciae, cephalad; these fasciae are widest ventrad; hypopygium yellow. Coxae and legs yellow, tarsi and tibial spurs brown; one posterior basal hind coxal seta; fore tarsal joints on under side serrate. Fore metatarsus slightly longer than tibia. Wing hyaline, subcosta ends in R_1. Petiole of media two-thirds length of R-M cross-vein. Cubitus forks under proximal end of R-M cross-vein. Anal vein extends distad of fork of cubitus. Halteres yellow. Savary Island, 9:IV:17.

Rhymosia brevicornis sp. nov.

Male. Length 5.5 m.m. Head fuscous, the scape, and palpi yellow; antennae slightly shorter than length of thorax. Thorax dull yellow, dorsum of mesonotum and pleurae fuscous; scutellum and metanotum fuscous; hairs appressed, yellow, setae black; 4 scutellar setae; segments 2 to 5 of abdomen with brown saddles, broadest anteriorly, posterior margins and ventral stripe subfuscous, leaving well marked yellow triangles on sides of segments 3 and 4; segments 1 and 6 dark brown; hypopygium yellow, large, being twice length of segment 6. Legs and coxae yellow; tarsi fuscous; one basal coxal seta. Wings yellowish hyaline, subcosta short, ending apparently free though close to Rs. Petiole of M and R-M cross-vein subequal. Cubitus forks proximad of proximal end of R-M cross-vein; anal vein stout, ends slightly distad of fork of cubitus. Halteres yellow. Fore metatarsus slightly shorter than tibia. Vancouver, B. C., 28:IV:17.

Tetragoneura atra sp. nov.

Male. Length 4 m.m. Black, including knob of halteres and hypopygium; antennae black, including basal joints; palpi black; middle and hind coxae fuscous, front coxae and femora yellowish brown, tibiae brown, tarsi black; hairs on thorax and abdomen pale; wings grayish hyaline, the subcostal vein ends in R_1 at nearly two-thirds of distance between humeral cross-vein and base of the radial sector; cubitus detached but not attenuated, beginning at a point in line with the R-M cross-vein produced. Cell R_1 very little longer than wide, almost a perfect rhombus.

Female. Like the male but scape of antennae and genitalia are yellow. Cu_1 slightly attenuated at proximal end. R_{2-3} wanting in one wing.

Described from two males and one female taken at Vancouver, May and June.

Tetragoneura marceda sp. nov.

Male. Length 3.5 m.m. Head black, base of antennae and palpi yellow, remainder of antennae dark brown; thorax, scutellum and abdomen brown, hypopygium yellowish; hairs on thorax and abdomen yellow or reddish brown; halteres, coxae and femora yellow, tibiae yellowish brown, tarsi dark brown; wings hyaline, subcostal vein ends in R_1 about midway between the humeral cross-vein and base of the radial sector; cubitus forks close to its base, cu_1 detached and attenuated at proximal end; cell R_1 scarcely as long as wide.

Twenty-nine males and six females taken at Savary Island and Vancouver, B. C., April and May. Of these specimens only seven males and two females have the rhomboidal cell complete in both wings; seven males and one female are zygomorphic, the vein R_{2-3} being absent in one wing; fifteen males and three females are destitute of vein R_{2-3} in both wings. In some specimens the cell R_1 is very short, vein R_{2-3} almost touching the base of radial sector.

Female. Like the male, but usually lighter in color, the humeri and genitalia being yellow.

Tetragoneura fallax sp. nov.

Male. Length 4.5 m.m. Head black, base of antennae and palpi yellow; remainder of antennae dark brown; thorax and abdomen dark brown; humeri, edge of scutellum and metanotum yellow; the metanotum more or less fuscous dorsally; the large hypopygium mostly dark brown, the interior parts mostly yellow; legs yellow changing to subfuscous and fuscous in tibiae and tarsi; setae and hairs yellow; halteres yellow; wing hyaline, veins strong, subcosta ends in R_1 about midway betwen humeral cross-vein and base of radial sector; cubitus forks slightly proximad of proximal end of R-M cross-vein, or directly under it; cu_1 not detached; length of cell R_1 about 1.5 times its width.

Female. Color usually more dilute; genitalia yellow.

In a series of forty specimens, thirteen males and twenty-seven females, taken at Savary Island and Vancouver in April, May and December, there is considerable variation in:

(a) Relative position of end of subcosta.
(b) Relative position of fork of cubitus.
(c) Length of small cell.

Two males and four females have R_{2-3} wanting in one or both wings.

Tetragoneura arcuata sp. nov.

Male. Length 3 m.m. Head black, base of antennae and palpi yellow, remainder of antennae dark brown; thorax, scutellum, metanotum and abdomen dark brown, hypopygium largely brown; hairs on thorax and abdomen yellow; halteres yellow, the knob tipped with brown; legs yellow, middle and hind coxae brownish, tibiae and tarsi

shading from light to dark brown; wings hyaline, subcosta ends in R_1 about two-fifths of the distance between the humeral cross-vein and base of radial sector; cubitus forks about under distal end of subcosta, not detached; anterior veins much stronger than posterior; R_{4-5} strongly arched in proximal half, distal half being only gently curved; length of rhomboidal cell varies from 1.25 to 1.75 its width; base of radial sector and R_{2-3} slender.

Female. Resembles the male; genitalia yellow tipped with dark brown.

Described from a series of one male and four females taken during May and June in the vicinity of Vancouver.

THE LIFE HISTORY OF APATETICUS CROCATUS Uhl.

(HEMIPTERA)

By W. Downes.

The species which forms the subject of the present paper is a large pentatomid bug which is fairly common in the neighbourhood of Victoria and a somewhat familiar object during the late summer and fall. It belongs to the class popularly called "stink bugs," a well-earned name by the way, and is one of the largest members of the Heteroptera in our local fauna.

Although, in common with the rest of the pentatomids, it has an uneviable reputation owing to the possession of repugnatorial glands which secrete the objectionable odour familiar to all who have attempted to handle them, nevertheless the species we are considering has good points which make it worthy of our interest and protection, for it is of considerable economic value, its food consisting to a very large extent of caterpillars, especially tent caterpillars, and larvae of the oak looper **(Ellopia somniaria)**, so that it may be classed among our useful insects.

Wherever caterpillars are numerous, these bugs will be found. Many of them take up their abode within the webs made by the tent caterpillars, where they find a plentiful food supply within easy reach. Others are found on the oak trees infested with "looper" caterpillars, but they are not entirely dependent on animal food by any means. In fact, a certain amount of vegetable food is essential for them, and during the first instar the little nymphs are entirely phytophagous and possibly the species may be able to subsist without much animal food.

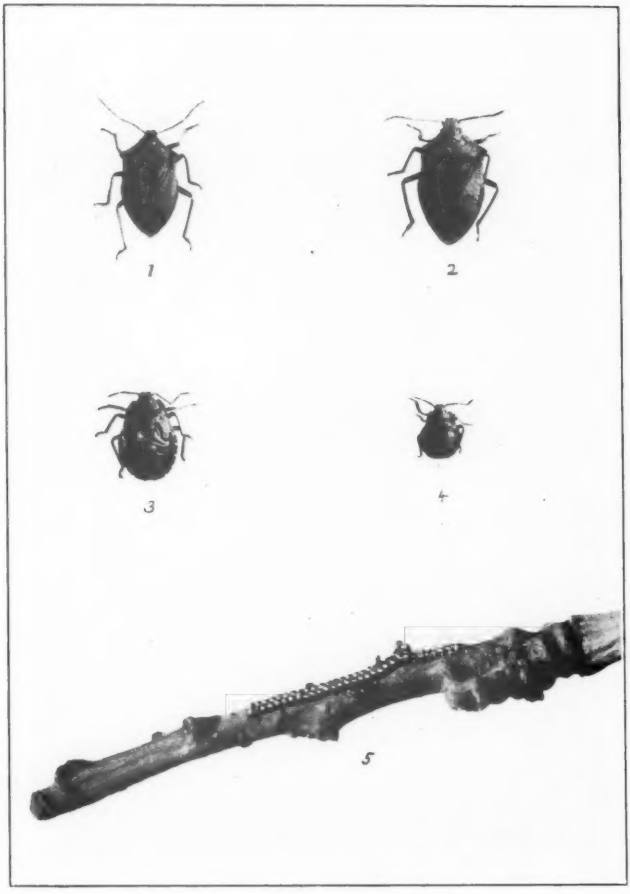
The Egg. The egg is cylindrical with slightly convex sides, its height being about one-third greater than its diameter, somewhat barrel-shaped in fact. The top and bottom are convex and the cap, or lid, is surrounded by a fringe of short incurving spines. The eggs are smooth and shiny and in colour are brownish black with irregular oval areas of dull white on the sides. Around the rim is a narrow white band from which arises the chaplet of spines of the same colour, tipped with black.

The eggs stand upright in a double row, usually on the upper side of a twig and may be sixty or seventy in number. One female that I watched laid her eggs on the upright iron standard of my garden gate. The time occupied in depositing one egg varied, but was usually about four minutes. Having deposited an egg on the right, the female moved slightly upward and laid another on the left, touching, but slightly in advance of, the first. The next egg would be deposited on the right side, touching the first egg and slightly in advance of the second, and so on alternately on the right and left until the double line was complete, each egg standing in the angle formed by the junction of the eggs in the opposite row. At first the eggs are white, but darken within a few minutes. The majority are probably laid in September and October. Those that I have observed were laid on October 25th. These hatched on May 19th following. Another lot collected in the field hatched on April 21st, and a third lot from an oak tree hatched on June 7th. The little bugs when newly emerged from the egg are entirely red but harden within half an hour; the legs, head and thorax becoming black, while the abdomen remains a deep red, bordered by a row of black spots and with a row of large quadrangular black markings on the central dorsal line.

The Nymphal Stages. During the first instar the nymphs are gregarious and usually remain clustered together, a habit common to many species of pentatomids, and so far as I have observed, are entirely vegetable feeders during this period. After the first moult, however, they show a tendency to wander and commence to feed on other insects when opportunity is given. The gregarious habit is abandoned during the later moults.

On April 21st, 1919, the first lot of nymphs kept under observation hatched from a batch of eggs laid on an apple twig. These were divided into two lots, one of which was kept at my residence while the other remained at the laboratory. Petri dishes with covers were used for breeding cages at first, but were soon abandoned in favour of fruit jars covered with muslin, as the moisture condensed in large drops in the petri dishes and drowned many of the little nymphs.

The lot kept at the laboratory progressed at first much more rapidly than those at the house. They were supplied with sprays of young pear leaves, on which they were occasionally observed to feed. The first moult occurred in this lot on April 30th, but those at the house did not moult until May 6th. The average temperature at the laboratory was several degrees higher than at the house, which partly accounts for the more rapid growth of the nymphs. On May 10th, five nymphs of this lot were observed to be feeding on a bud-moth larva. A nest of tent caterpillars was obtained and placed in the jar, and shortly after several of the nymphs were seen to be attacking these. It was found, however, that many nymphs were lost by getting entangled in the webs, also,



Apateticus crocatus Uhl.

Fig. 1. Adult male.
Fig. 2. Adult female.
Fig. 3. Nymph, fifth stage.
Fig. 4. Nymph, fourth stage.
Fig. 5. Eggs on twig, young nymphs emerging.

that at this stage of their growth they cannot live extensively on animal food but require a constant supply of fresh green leaves. They seem to require a certain amount of moisture and were seen sucking at drops that condensed on the glass of the breeding jar. The experiment of feeding them on syrup, of white sugar and water, was tried, and this they took readily. The second moult of those kept at the house was noted on May 20th, the third on June 2nd, the fourth on June 19th, and the fifth on July th. Four lots were kept under observation at different periods and the average length of the instars was found to be thirteen days under artificial conditions, the fourth and fifth instars being the longest. I was able to observe the change from the last nymphal stage to adult. The nymph in each case rested head downwards hanging from a twig. Ecdysis was complete in ten minutes and as soon as free the adult reversed its position. At first the adults are pale salmon pink and do not harden completely for nearly two days. The final moult was observed on July 8th and on the 10th the bugs were observed to be sufficiently hardened and attacking tent caterpillars. During the fifth instar the nymphs refused animal food, seeming to prefer plant juices. Young branches of wild rose were supplied, the bugs invariably sucking from the leaf petioles or midribs. Other plant food besides briar rose was tried, namely, pear, apple, oak and willow, but rose seemed to be preferred. Of the four broods kept under observation the last reached adult condition on August 18th.

Feeding Habits. It was interesting to observe the extreme timidity and caution which marked the attitude of the bugs when attacking their prey. Not being possessed of any weapon to aid them, such as the powerful grasping forelegs of those species that are solely predatory, they are forced to await a propitious time for attack. On scenting game the beak is immediately extended and the bug advances towards its quarry. Usually weak and sickly caterpillars are selected or one that is in such a position as to be unable to escape. When within half an inch or so the rate of advance is cautiously slackened and the progress of the extended beak towards the caterpillar becomes so slow as to be scarcely perceptible. Should the caterpillar make the slightest movement, the bug immediately retreats, advancing again and again until at last from sheer weariness the caterpillar permits the beak to be inserted. Once this occurs there is no escape. The barbed tips of the maxillae give the bug a hold that is not readily shaken off, and despite wriggling and squirming the beak turns in the wound without withdrawing. Not until the caterpillar is sucked dry does the bug withdraw its beak, and it may retain its hold for as long as twelve hours. It is only when pressed by hunger that they show any boldness. Some that had been without food for nearly a fortnight were supplied with larvae of the poplar sawfly (**Platycampus victoria** MacGill). These they accepted readily, following them up with beak extended and

antennae quivering, and when near their prey, would make a short rush forward, stabbing the larvae with their beaks.

Mating was first observed on July 22nd, but probably owing to an insufficient food supply, I failed to get the females to oviposit.

DESCRIPTION OF LIFE STAGES

Egg. Height, 1.07 mm.; width, .80 mm.; width of cap, .56 mm.; shape, oval cylindrical; smooth, glossy; base flattened; sides and cap slightly convex; general appearance, brownish-black in color with large irregular areas of white on the sides, cap black, surrounded by a narrow white circle, from the outer edge of which arises a row of incurving white spines, sixteen to nineteen in number. Eggs are laid in a double row firmly attached to one another and to their support.

Nymph: first instar. *Body* broadly ovate, narrowing anteriorly, broadly rounded posteriorly. Average length, 1.76 mm. Average width, 1.60 mm. *Head*, somewhat rounded in front, nearly twice as broad as long, posterior margin rounded; width, including eyes, .72 mm. *Prothorax* narrow, curving anteriorly, twice as wide as head, excluding the eyes, shortest at median dorsal line, from thence widening slightly to lateral margins. *Mesothorax* one-fifth shorter and slightly wider than prothorax, curving anteriorly. *Abdomen*, rounded, dorsum convex, nearly one half as long as wide. *Antennae*, stout, medium length, slightly pubescent, terminal joint the longest, thickened and tapering at proximal and distal extremities. Length, 1.35 mm.; 1st segment, .15 mm.; 2nd segment, .36 mm.; 3rd segment, .30 mm.; 4th segment, .53 mm. Legs medium length, strong; hind tibia, .46 mm. *Color*, head, antennae, prothorax, mesothorax and legs black, eyes red, abdomen crimson, conspicuously marked on the median dorsal line with four quadrangular black spots; lateral margins spotted with four quadrangular black markings; ventral surface of abdomen red, lateral margins spotted with black.

Second Instar. Body longer, broadly pyriform, length 1.90 mm.—2.6 mm. *Head*, quadrate, anterior outline slightly curved, posterior margin curved, tylus distinct, not shorter than juga, eyes prominent. Width, including eyes, .845 mm. *Prothorax*, one-third wider than head, curving anteriorly. Anterior and posterior margins nearly parallel, divergent at sides, lateral margins explanate. *Mesothorax* of nearly equal length and width to prothorax, curving anteriorly, shorter at lateral margins, anterior margin slightly curved, posterior margin broadly angled. *Metathorax* very short at median dorsal line, from thence widening to lateral margins, width scarcely exceeding mesothorax. *Abdomen* rounded, dorsum convex, venter slightly convex. *Antennae*, more slender, pubescent; length, 1.93 mm.; 1st segment, .16 mm.; 2nd segment, .6 mm.; 3rd segment, .5 mm.; 4th segment, .6 mm. *Legs*, strong, tarsi furnished with a few short hairs, claws strong, recurved; length of hind tibia, .96 mm. *Color*, dorsal surface of head and thorax black with a greenish metallic sheen, eyes red to brownish-black, under surface of thorax, legs and rostrum piceous; *antennae* brownish-black; *abdomen* crimson, with four quadrangular greenish-black spots on median dorsal line, lateral margins spotted as before, the spots being relatively smaller than in the first instar; ventral surface of abdomen crimson, lateral margins spotted with black.

Third Instar. Shape of body similar to previous instar, but abdomen more rotund. Average length, 3.86 mm. *Head*, sub-uadrate, eyes prominent, anterior margins of juga and tylus rounded, juga slightly longer than tylus, vertex rough; width, including eyes, 1.6 mm. *Prothorax*, two and one half times wider than

head, rugose, anterior and posterior margins parallel, anterior margin straight behind head, curving sharply forward behind the eyes; lateral margins explanate, rounded, converging to head, minutely serrulate; posterior margin straight, extremities curving slightly caudad. *Mesothorax*, slightly wider than prothorax at median dorsal line, thence narrowing to lateral margins, widest at posterior angles, central posterior margin broadly angled, projecting caudad. *Metathorax* slightly narrower than mesothorax and one half as long, constricted in centre, surface smooth. *Abdomen*, nearly round, dorsum strongly convex, venter slightly convex. *Antennae*, pubescent; length, 2.4 mm.; 1st segment, .2 mm.; 2nd segment, .86 mm.; 3rd segment, .6 mm.; 4th segment, .6 mm. *Legs*, strong, tibiae and tarsi slightly hairy, femora with a few short hairs. Length of hind tibia, 1.03 mm. *Color*, dorsal surface as before, ventral surface of thorax crimson, pleurae dusky, eyes and antennae black.

Fourth Instar. Shape similar to previous instar; length, 7.5 mm.; greatest width, 4.43 mm. *Head*, sub-quadrate, flattened, eyes prominent, juga rounded in front, longer than tylus, margins bordered by a small but distinct flange, surface roughened. *Prothorax*, twice as wide as head, rugose, callosities apparent, anterior and posterior margins nearly parallel, anterior margin curving sharply forward behind eyes, lateral margins explanate, minutely toothed, posterior margin slightly procurved, posterior angles projecting slightly caudad. *Mesothorax*, wider than prothorax and slightly longer at median line, surface rugose, posterior margin angled at centre, lateral lobes short, projecting caudad as far as second abdominal segment. *Metathorax*, three-fourths as wide as mesothorax, very short at centre, from thence widening and recurving on each side of median dorsal line. *Abdomen*, broad, rounded, dorsum convex, venter slightly convex. *Antennae*, pubescent, distal segment slightly thicker than 3rd; length, 4.2 mm.; 1st segment, .43 mm.; 2nd segment, 1.56 mm.; 3rd segment, 1.1 mm.; 4th segment, 1.1 mm. *Legs*, tibiae and tarsi hairy, femora with a few short hairs; length of hind tibia, 2.3 mm. *Color*, the same as before, some individuals showing coppery metallic tints on dorsal surface of head and thorax.

Fifth Instar. Body more ovate, abdomen less tumid, wing pads developed; length, 10 to 12 mm.; width, 7 to 8 mm. *Head*, as in previous stages but juga relatively longer, lateral margins curved. *Prothorax*, equal in length to head and twice as wide; anterior margin curved, lateral margins converging anteriorly, explanate and irregularly toothed, posterior margin slightly procurved, lateral posterior angles acute, projecting caudad, surface rugose, callosities large. *Mesothorax* one-third longer than prothorax, wing pads extending beyond second abdominal segment; central portion of posterior margin angled and extending caudad beyond metathorax, surface minutely punctate. *Metathorax*, very short, narrow, one half as wide as mesothorax, apparent only between the angles formed by the wing pads. *Abdomen* oval, dorsal and ventral surfaces convex, the larger spots on median dorsal line each with an elliptical rugose callus; inner portion of spots on lateral margins bifurcate. *Antennae*, pubescent, terminal segment scarcely thicker than the third; length, 5.53 mm.; 1st segment, .5 mm.; 2nd segment, 2.3 mm.; 3rd segment, 1.43 mm.; 4th segment, 1.3 mm. *Legs*, strong as in previous instar; hind tibia, 3.4 mm. *Color*, variable, dorsal surface of head and thorax and spots on abdomen coppery metallic green with golden sheen in some individuals, others with thorax mottled with red; dorsal surface of abdomen crimson, ventral surface pale red, pleurae dusky, legs and antennae black with metallic green reflections.

Adult. Uhler's original description (1) is as follows:

"**Podisus crocatus**, New sp.—Broad, suboval, more robust than **P. cynicus** Say., and with blunter and more callous humeral angles. Color dull orange,

brighter beneath, coarsely, deeply and unevenly punctate with dark green. Head sub-quadrate, longer than wide, margined with dark green, often with two dark, short stripes on the basal raised lines, and with a dark streak on the middle of the tylus, reliefs between the eyes strongly defined, lateral lobes somewhat longer than the tylus, more finely punctate than the vertex, their outer angles a little rounded and marked with dark green. Underside of head polished, sparsely and finely punctate in separated patches or lines, the under submargin of the lateral lobes closely and deeply punctate; rostrum reaching to just behind the middle coxae, the second joint reaching to the posterior margin of the anterior coxae; antennae dusky rufous, darker on middle of last three segments. Pronotum wide, deeply, coarsely punctate, mostly in transverse wavy lines, and punctures partly confluent on the disk, depression at base of forward lobe marked with a transverse series of indented and discolored spots, the posterior lobe more or less darkened with obscure green, the humeral angles irregularly triangular, callous at tip, a little shorter and less acute than in **P. cynicus** Say., the extremity often dark green, and charged with four wrinkles, anterior part of lateral margin coarsely granulate-serrate. Pleural pieces coarsely, remotely, deeply punctate, excepting the area around the ostiolar canal. Legs luteous, sparsely punctate, the femora more or less pointed with rufous, and wrinkled. Scutellum more finely punctate, clouded with green, the middle line smooth and very sparsely punctate. Clavus narrow, dark, luteous, greenish at base, punctate in lines; corium finely and remotely punctate with green, the costal area more coarsely so, and more spotted, membrane longer than the venter, pale bronze, finely granulated, the veins a little darker. Venter coarsely, remotely, unevenly punctate and rugose on the sides, with a broad, smooth, middle line, almost impunctate; tergum purplish black, dull, the connexivum orange, punctate with red, the sutures of the segments broadly marked with a quadrate, black-green, densely punctate spot across the entire width of the connexivum; ventral spur long, acute in the male, blunter in the female. Length to end of venter 13 to 17 mm. Width across humeral angles 8 to 10 mm.

"This species is common in Western Oregon and Washington Territories. It occurs also on Vancouver Island, and extends south into California. The third joint of the antennae is much shorter than the preceding or following ones, the second is longest, and nearly twice as long as the third. The species is very variable in the degree and amount of dark marking on the several parts of the upper surface."

The color of both sexes varies considerably, but in general the ground color is pale brown or fawn, more or less suffused or mottled with dark green with a metallic lustre. In some individuals the ground color is almost obscured, while others are uniformly pale with an entire absence of green excepting the brilliant metallic spots on the connexivum. In such individuals the tergum is crimson; in dark specimens it is black.

The vaginal plate is triangular, and the characteristics of the female genitalia resemble those of its near ally **bracteatus.** The most noticeable structural character differentiating **crocatus** from **bracteatus** is the shape of the lateral pronotal spines, which are short and blunt, while those of **bracteatus** are decidedly more acute and projecting. In a series of eighteen specimens of **crocatus** before me I find this feature constant. In **cynicus** the vaginal plate is quadrangular, which clearly distinguishes it from both **crocatus** and **bracteatus.**

Bracteatus has been recorded as occurring on Vancouver Island (2), but during four years' collecting I have not as yet come across any specimens that could be referred to this species.

I wish to express my acknowledgments to Dr. H. M. Parshley who has assisted me by sending specimens of **Apateticus bracteatus** for comparison and a copy of Uhler's original description.

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THE GENUS ARGYNNIS IN BRITISH COLUMBIA

By E. H. Blackmore, F.E.S.

The genus Argynnis, or, as they are commonly called, Fritillaries or Silver-spots, belong to the family **Nymphalidae** or brush-footed butterflies, so called on account of the first pair of legs being aborted, and folded in front of them, thus being of no use for walking purposes.

This genus is one of the largest in this family; it is well represented in Europe, and is found in Asia, China and Japan. Several species are found in Australia, and two or three species in Africa, but it is in North America that it has found its greatest development. They are found on high mountains up to the timber limit, and at lower elevations down to sea-level, but they are, generally speaking, a mountain-loving group.

The species composing this genus are of moderate or large size, and are distinguished by their bright tawny or fulvous colour, with well defined black markings, which consist of waved transverse lines and rounded or triangular markings on the outer borders.

A great many species so closely approximate each other that great difficulty is experienced in separating them satisfactorily; most of the eastern species have had their life histories carefully worked out, so that not much difficulty is now experienced in determining them, but it is our western forms that have caused the most trouble to students of this genus. Many different causes are responsible for this confusion; in some cases the limits of variation are not very well known; and in others, species intergrade with each other so that in a long series it is hard to tell where one species leaves off and another one begins. Misidentifications and confusion of species by some of the older authors led to a great deal of trouble in this respect. In some cases descriptions have not been detailed enough to allow of a definite placing of species, and have been so vaguely worded that they will allow two or three different forms to fit it in a more or less satisfactory manner.

Fortunately, for present day systematists, Dr. Wm. Barnes some years ago—1913, to be exact—sent Dr. J. McDunnough to Europe for

the express purpose of studying the type specimens of No. Amer. Lepidoptera which were contained in British, French, Belgium and German Museums. After his return from Europe he visited the principal museums of the United States, where type collections were known to exist. The total result of these examinations of type specimens has been to elucidate many perplexing problems, and to put our knowledge of the species on a far better basis than has hitherto been possible. In the genus under discussion, there still remains in certain groups, much work to be done in careful breeding, and a comparison of the larval stages before a proper understanding of the species can be arrived at.

Egg. The eggs of this genus are beautiful objects under the microscope, being truncate conoidal, in shape something like a thimble, ornamented on the side by parallel raised ridges, between these ridges are a number of small cross ridges, giving it a reticulated appearance. According to W. G. Wright, in his "Butterflies of the West Coast," some species of this genus oviposit like a grasshopper, thrusting the ovipositor down amongst the dead leaves and rubbish under small bushes; others drop their eggs while flying over suitable places. The eggs hatch in about three weeks, the young larva devouring its shell; it then goes into lethargy without eating anything else and thus it hibernates, a tiny thing, not half so big as a pin's head, naked, without any covering, in the wet and frozen rubbish, till the leaves of its food plant shall grow in the early spring.

Larva. The larvae are cylindrical and covered with spines, the first segment always bearing a pair of spines somewhat longer than the others. So far as is known the North American species of this genus feed on the various species of wild violets, they are nocturnal feeders, lying concealed during the day.

Chrysalis. The chrysalids are rather large; angular; with more or less prominent projections and a bifid head.

As stated before, North America has shown the greatest development in this genus, no less than 63 described forms and species being recognized in the B. & McD. Check List.

In the 1904 B. C. Check List 14 species were listed, 9 of which were misidentifications, and in some cases the same species was listed under two or three different names. I am rather afraid that comparison with Holland's Butterfly Book was responsible for many of the errors in that list.

In the 1906 List we find but 10 species listed, of which only four were misidentifications, or species not occurring in the Province.

Up to the present I have 8 species and 7 geographical races listed from the Province, and out of these 15 forms I have 14 in my own collection, the remaining species being found in the far north of the Province.

1. **Argynnis leto** Behr. This is the largest and most beautiful species that we have in the Province. It is especially interesting from

the fact that there are no normal coloured females, instead of being fulvous they are of a blackish-brown colour, with the sub-terminal area of a pale straw yellow. The question whether there were ever any normal-coloured females in an interesting one. The localities I have it from are Princeton, Similkameen, Vernon, Armstrong, and Rossland.

2. **A. aphrodite** race **columbia** Hy. Edw. Until quite recently **columbia** has always been considered a distinct species, but upon an examination of the type by Dr. McDunnough it is now considered a small northern form of **aphrodite.** It resembles **atlantis** somewhat, and with which it has very often been associated, but they can always be separated in the males by the fact that in **atlantis** the veins on the primaries are enlarged or thickened by black scales. It was described from Lake La Hache and Quesnel in 1877, but it has a wide distribution throughout the northern part of Canada. I have specimens of this species from Chilcotin.

3. **A. atlantis** Edw. Although this butterfly occurs from the Hope Mountains to the Rockies, it is not listed in our B. C. Check Lists. It was probably listed under the name of **electa** Edw., which is, however, a larger and more heavily marked insect. I have it recorded from a number of localities, including Atlin, Mt. McLean, Armstrong, Osoyoos, and Rossland.

4. **A. electa** Edw. This is one of the commonest species of this genus in the Interior. I have it from a large number of localities between Princeton and the Rocky Mountains. There has been a considerable mix up in the types of **chitone, electa,** and **cornelia,** the latter of which is now sunk as a synonym of **electa.** Edwards had several forms before him when he described this species, but the type is now restricted to a male from No. Colo., taken by Mead in 1871.

In the Vernon district we have another species going under this name with the discal area of the underside of the secondaries suffused with chocolate brown. They could not be matched in the Barnes collection, and may be an undescribed form of either **electa** or **chitone.**

5. **A. bremneri** Edw. In our B. C. Check Lists the locality of this species is given as "generally distributed," but this is wrong, as I have no record of its being taken anywhere than on Vancouver Island and the Lower Fraser Valley. Possibly the undescribed form mentioned above has been confused with it, as they bear a general resemblance to each other.

6. **A. hydaspe** race **rhodope** Edw. This with the preceding species are the only two that occur on Vancouver Island, so that we are rather poorly off in this particular section of the Province. **Rhodope,** which previously held specific rank, is now regarded as the extremely heavily marked northern race of **hydaspe** which occurs in the Yosemite Valley, Cal. The race **purpurascens** of Siskiyou Co., Calif., being the connecting link between the two. **Rhodope** so far has only been found in British

Columbia, the type locality being given as the Fraser River. There is considerable variation in the amount of silver on the spots underneath, typically the marginal row of triangular spots are well silvered with the remainder of the spots straw yellow, but in many cases the amount of silver on this outside row are greatly reduced, while occasionally, on the other hand, nearly all the spots are silvered.

7. **A. hydaspe** race **sakuntula** Skin. This race was described in 1911 partly from material taken at Ainsworth and Kaslo. It is not quite so heavily marked on the upper side as **rhodope** but underneath the spots are entirely unsilvered, all being of a yellow colour. In addition to the above localities, I have the species from Rossland. It is evidently a high altitude species.

8. **A. nevadensis** Edw. This species, together with **meadii, edwardsi** and **snyderi** belong to a distinct group, which have the spots elongated and very heavily silvered and with a green suffusion on underside of secondaries. It is rather uncommon in B. C., as Vernon and Princeton are the only localities I have seen it from, although in some parts of Eastern California it is one of the commonest species of this genus.

9. **A. nevadensis** race **meadi** Edw. This form that we take in B. C. and through the Rocky Mountains to Calgary has never been satisfactorily placed. Some years ago the late Wolley Dod sent a series to Dr. Skinner who, in returning them, said: "They are certainly not **edwardsii** nor are they true **nevadensis,** nor are they exactly like the Colorado **meadi,** but they come nearest to **meadi."** This form occurs at Princeton, Similkameen, Armstrong and Vernon, and if some enterprising student in any of those districts would take upon himself the task of rearing this species from the egg, and make careful notes of all the larval stages, it would go far, I am sure, towards solving this problem. Personally, I think it is a distinct geographical race of **meadi,** which latter is typical in the mountains of Colorado.

10. **A. platina** Skin. This belongs to the **halcyone-coronis** group. The late Wolley Dod never quite satisfactorily separated this group, although he had quite a nice series for comparison; he also had specimens from Idaho (one of the type localities) and from Utah. The trouble is that some species that are found hundreds of miles from their nimotypical locality are subject to changes of colouration of the underside of secondaries, and also in the black markings of the upper-side, which may be markedly heavier or again may be somewhat reduced. These differences in colouration and maculation are probably due to a change of food plant and to climatic conditions.

So far this species has only been recorded from Osoyoos, but Wolley Dod took a pair at Brisco, B. C., about 35 miles below Windermere, which are probably referable to this species. I did not possess a speci-

men of this species until recently, when a specimen was sent to me by Dr. J. McDunnough through the kindness of Dr. G. Hewitt, the Dominion Entomologist.

11. **A. snyderi** Skin. I have a single specimen, as yet unexpanded, which has been identified by Dr. McDunnough as this species. It was taken by the late Capt. Harvey, at Vernon, in 1904. Dr. Fletcher, to whom it had been sent, returned it as "undescribed." It was described in 1897 from specimens taken in Utah. I have compared it with the description, with which it agrees. I have not seen any others, although I have examined a great deal of Vernon material in the last few years.

12. **A. mormonia** race **erinna** Edw. This is one of the small Argynnids and so far has only been found in the Kootenay country. It differs very little from the typical form **mormonia,** which occurs in California and Southern Oregon. **Erinna** was described from Spokane, Wash., and the name is retained to indicate the northern form. It resembles closely the following species, but it can be distinguished by its lighter colour and reduced black markings on the upper-side, and by the total lack of green suffusion on the secondaries on the under-side; in this case the disk being suffused with cinnamon brown.

13. **A. bischoffi** Edw. This species was described from Kodiak, Alaska, in 1870. Mr. E. M. Anderson took two specimens at Atlin in 1914, which are the only records for B. C. In the Report Canadian Arctic Expedition recently to hand, Gibson records the capture of a single specimen at Mayo Lake in the Yukon, by Mr. J. Keele in 1904.

14. **A. bischoffi** race **opis** Edw. This species was described from specimens taken at Bald Mt., Cariboo, and I have it from the Hope Mountains, Kaslo, Field, and the Taku River. It is the same insect that has been in our lists under the name of **eurynome** var. **clio** for many years. Dr. Dyar sunk **opis** as a synonym of **clio,** but this is not the case, as the green scaling at the base of the secondaries on the under-side show a greater affinity to **bischoffi** than to **eurynome.** This is the form that has the spots entirely unsilvered.

15. **A. bischoffi** race **washingtonia** B. & McD. This race was described in April, 1913, from specimens taken by Dr. McDunnough on Mt. Rainier, Wash. This is the southern representative of the Alaskan **bischoffi.** This is the same butterfly that has been in our lists for many years as **eurynome,** which, of course, with its race **clio** will now be dropped and **opis** and **washingtonia** will take their place. **Washingtonia** is considerably smaller than the average expanse of **eurynome** and the spots are well-silvered. It has practically the same range as the preceding and will no doubt we found on all of the higher peaks of the mountains of Southern British Columbia.

VITULA SERRATILINEELLA Rag., A Honey Feeding Larva

By J. Wm. Cockle, Kaslo, B. C.

Having set aside some frames of partially capped honey, I was much surprised when examining them in October to see that they were covered with what appeared at first sight as cobweb; on closer examination I discovered a lot of small whitish larvae secreted under the webs in the partially filled cells. Where the cell was empty the larva was to be seen coiled up in the bottom, but in case the larva was feeding on the honey it had spun a web about one and a half inches in diameter over the comb and either rested on the web or under it. Observation showed that the larva reached down through a hole in the web to feed, but did not remain in the cell until all the honey had been extracted. In a few instances when the larva had emptied the first cell it had pierced the wall of the adjoining cell, from which it continued feeding; this was the exception and not the rule; most of the larvae fed from the top.

On October 14th, finding that the number of larvae were decreasing and that there were no signs of any pupae, I removed the balance to a breeding jar, placing in it a little dry earth, a few dry leaves and a small block of comb honey.

When removing one of the larvae from which to make a description, I took it up on the point of the knife with which I had previously cut the honey. It crawled over the honey without the slightest trouble, the stickiness did not appear to inconvenience it at all or to interfere with its progress, but they prefer to travel upon the dry comb or upon the mat of silk with which they cover the comb surrounding the cell from which they are feeding and in which they leave a small hole over the cell through which they feed.

During the succeeding months the larvae spun tunnelled silk passages all round the jar, extending them both through the comb and also down into the dry earth at the bottom of the jar. They covered the whole interior of the jar with a mat of silk as thick as a good sheet of paper but could be observed through the glass resting in the tunnels. In these they passed the winter, and as they were kept in a warm room, they were never dormant but appeared to be feeding all the time.

Description of mature larva. Length 16 m.m. Color cream. Head light brown, mandibles and lower edge of cheek much darker brown, thoracic segment lighter than head, divided at dorsum, a dark brown splash at stigma, abdominal segments with tubercles at 1 and 2 more or less brownish, hairs white. Last abdominal segment with two eyed brown rings at 2, from these the hairs are longer than those on the other segments, also a tubercle at 1 with a heavy brown spot but not ringed. Anal segment splashed with brown which extends down to the vent, there are also 4 brown spots. Feet concolorous.

Pupa. Date of pupation not observed but was probably during March. Color light golden brown, slightly darker at head and anal

segment, a row of raised brown tubercles on stigma, that on the second abdominal segment partially overlapping the upper edge of the wing cover, on the third the tubercle is just above the edge of the wing cover, on the fourth there is a secondary tubercle below and anterior to the major one, the anal segment is without tubercles and is armed with several short spines.

The pupa was enclosed in a white silk cocoon placed mostly within the tunnels. This factor was mainly responsible for the almost complete loss of the resulting imagoes, some of them being denuded of all scales in their passage through the silk net, whilst others were damaged by contact with the honey, the net result being one male and one female secured for identification.

Date of emergence, May 29th, 1919, on which date two specimens were taken at light outside. The latter agree with some named **V. serratilineella** by Dr. Dyar, the bred specimens are slightly grayer and are not so contrasting in maculation. I am indebted to the kindness of Dr. J. McDonnough for verification of my indentification. To quote from his letter, he says: "I think you will be safe in calling the species **V. serratilineella,** although personally I have never been satisfactorily able to separate this western species from its near ally in the east, **V. edmandsi** Pack. The maculation is identical and the habits appear to be the same in both species, the only difference being that the western form is slightly larger. However, in view of the geographical distribution it seems advisable at present to retain the name **serratilineella** for the western form."

The habit referred to by Dr. McDonnough, is the fact that **V. edmandsi** is an inquiline of Bumble Bees nests in which it feeds; a description of this is given in Parkard's Guide to the Study of Insects.

Dr. Dyar in Pro. U. S. Nat. Museum, Vol. 27, page 921, records having taken this moth at Shawnigan Lake, B. C., Aug. 17th and Sept. 4th, whilst the Kaslo specimen that he had for identification was dated June 24. The dates of those in my collection are May 19, 29, June 7, 24, 29, July 9, 19, Aug. 12, Dec. 30, the latter taken in the house this winter.

I have also received specimens from Mr. Williams Hugh, of Cloverdale, B. C. His opinion is that it can never be considered an injurious pest, "strong colonies never tolerate its presence and the bees certainly clean up the webs from the combs."

Mr. F. W. L. Sladen, Dominion Apiculturist, writes me that he has never observed it, and Mr. W. J. Sheppard, Provincial Apiculturist, also informs me that although he examined thousands of hives in British Columbia during the past six years that he has not seen any evidence of it.

The conclusion is, that this moth will only be found amongst stored frames or diseased colonies.